

## Exclusive and Non-Exclusive Breastfeeding among Stunted and Normal 6–9 Month-Old-Children in Jatinangor Subdistrict, Indonesia

Viramitha Kusnandi Rusmil,<sup>1</sup> Tri Oktaviani Prahastuti,<sup>2</sup> Dimas Erlangga Luftimas,<sup>3</sup> Tisnasari Hafsah<sup>1</sup>

<sup>1</sup>Department of Child Health Faculty of Medicine Universitas Padjadjaran/Dr. Hasan Sadikin General Hospital, Bandung, Indonesia <sup>2</sup> Faculty of Medicine Universitas Padjadjaran, Indonesia,

<sup>3</sup>Departement of Public Health Faculty of Medicine Universitas Padjadjaran, Indonesia

### Abstract

**Background:** Stunting has become a public health problem in Indonesia, with the prevalence of stunting is 37.2% nationally and 25.6% in West Java. One of the causes of stunting is malnutrition that may occur because of not giving exclusive breastfeeding on the first 1000 days of life (FDL). The purpose of this study was to determine whether there was difference between exclusive and non-exclusive breastfeeding among stunted and normal 6–9 month-old-children.

**Methods:** This study was conducted using a cross-sectional analytic study during August-October 2018 with consecutive sampling method. This study involved 110 pairs of mothers and children aged 6–9 months who resided in villages which were within the work area of Jatinangor Public Health Center. Nutritional status was determined based on length-for-age z score according to WHO. The type of breastfeeding was known based on the questionnaire. Data was analyzed by chi square test.

**Result:** There were 60 of 110 children (54.5%) who did not receive exclusive breastfeeding. The incidence of stunting in children was 12.7% (14 of 110), of whom 10 children had no exclusive breastfeeding ( $p>0.05$ ).

**Conclusions:** Although the incidence of stunting is higher in non-exclusive breastfeeding group, there is no difference in the proportion of stunting in children aged 6–9 months between those who are exclusively breastfed and those who are not, however, exclusive breastfeeding is encouraged.

**Keywords:** Exclusive breastfeeding, nutritional status, stunting

### Introduction

Stunting is a disruption of growth and development in children caused by malnutrition, recurrent infections, and insufficient psychosocial stimulation.<sup>1</sup> Children with stunting are identified with short stature who have a height/body length that is not in accordance with their age and sex. A child is designated as stunting when the length-for-age z score (LAZ) is less than minus-two standard deviation (SD) according to the World Health Organization (WHO) Child Growth Standards.<sup>1</sup> Based on data released by the United Nation Children's Fund (UNICEF), the number of children with stunting in the world has decreased every year; in 2010 as many as 169.8 million children were stunted,

then this number is decreased to 154.8 million children in 2016 with a prevalence of 22.9%.<sup>2</sup> However, in Indonesia, there has been an increase in the number of stunted children in recent years. Data from National Health Basic Research (*Riset Kesehatan Dasar*, *Riskesdas*) in 2013 reported that the prevalence of stunting reached 37.2% nationally, and the number is increased compared to 2010 (35.6%) and in 2007 (36.8%).<sup>3</sup> Stunting problems in Indonesia varies in prevalence in each province; in West Java province the prevalence of stunting is 35.3%.<sup>3</sup> In accordance with WHO provisions, stunting has become a public health problem in Indonesia and West Java, especially because the prevalence exceeds over 20%.<sup>3</sup>

Stunting is influenced by various factors. The disturbing factors of growth and development

**Correspondence:** Viramitha Kusnandi Rusmil, Departmen of Child Health Faculty of Medicine Universitas Padjadjaran/ Dr. Hasan Sadikin General Hospital, Jalan Pasteur 38, Bandung, Jawa Barat, Indonesia, Email: [virmith@yahoo.com](mailto:virmith@yahoo.com)

begin to appear when the child is still in the womb and also after birth. Stunting has a life-long impact.<sup>4</sup> In the short term, stunting is associated with infection-related morbidity and mortality.<sup>5,6</sup> In the intermediate term stunting can affect children's development, including cognitive abilities, behavior, and children's school participation.<sup>1,5</sup> In the long run, stunting affects economic achievement and the health later in adult life.<sup>4,6</sup> Considering the severity of the stunting effect that might occur, it creates an urgency to prevent and treat stunting immediately. This can be done by early detection and ensuring the fulfillment of the needed nutrition.

The term first 1000 days of life has been used to define a period of time that begins in the womb until the age of two years.<sup>7</sup> During this period there is a very rapid growth and development that does not occur in other age groups, thus, it is considered as a golden period.<sup>7</sup> Therefore, the adequacy of nutrition during this period greatly determines the growth and development of children in the future. Efforts to fulfill nutrition have been initiated by WHO and UNICEF since 2009 by issuing recommendations adapted from the Global Strategy for Infant and Young Child Feeding which consists of two main points, namely (1) exclusive breastfeeding until six months of age and (2) providing safe and nutritious complementary food starting at the age of six months while continuing breastfeeding remains until the age of two years or more.<sup>8</sup> In fact, exclusive breastfeeding and complementary feeding are still not in accordance with WHO recommendations, which are estimated to be only 34.8% of babies in the world receive exclusive breastfeeding, while the rest receive food or other fluids at an early age.<sup>8</sup> In Indonesia the prevalence of exclusive breastfeeding is 54.3% and in West Java 33.7%.<sup>9</sup> The number of exclusive breastfeeding in West Java province is still far below the national exclusive breastfeeding rate and is in the bottom three. The provision of breast milk that is not optimal, one of which the absence of exclusive breastfeeding will affect the adequacy of nutrition, that may cause stunting.<sup>1</sup> Intervention on stunting has good results if it is carried out during the first 1000 days of life period.

This study aimed to determine the differences in the proportion of stunting occurrences in children aged 6–9 months within the work area of Public Health Center (*Pusat Kesehatan Masyarakat*, Puskesmas) Jatinangor which is given exclusive and non-

exclusive breastfeeding. This study was conducted at a younger age group, so that the information produced can be useful for early detection of stunting events and a preliminary study for prevention and intervention of stunting events in the Puskesmas Jatinangor work area.

## Methods

This study used a cross-sectional analytic study design aimed at a pair of mothers and children aged 6–9 months. The minimum sample size is known by using the cross-sectional study sample formula for the qualitative variable, which is 90 people. The data taken in this study is primary data. Data collection was carried out in seven villages included in the work area of Puskesmas in Jatinangor during August–October 2018 with consecutive sampling method. The inclusion criteria for this study were pairs of mothers and children aged 6–9 months who resided in a village around the work area of Puskesmas Jatinangor. Exclusion criteria were children who had received complementary feeding before the age of 6 months, children with serious illness, and children with a history of premature birth.

Data was collected by the researcher team, assisted by integrated service post (*Pos Pelayanan Terpadu*, Posyandu) officers who had been trained before the data collection. After the mothers filled in the informed consent sheets, they were asked to fill in the questionnaires, containing the questions about the characteristics of the mother and the children, and the type of breastfeeding. The body length of children was then measured using infant meter (Seca, type 210).

Nutritional status was determined using data on body length and age of study subjects to calculate the length-for-age z score (LAZ). Interpretation of nutritional status was performed using child growth standards, based on WHO criteria. Furthermore, children were grouped into normal groups if LAZ  $\geq$  -2 SD and stunted if LAZ  $<$  -2 SD. The type of breastfeeding was determined by summing up the answers of several questions on the questionnaire regarding the history of children when they were 0–6 months old. From these data, children were then grouped into exclusive and non-exclusive breastfeeding groups. Bivariate analysis was performed by IBM Statistic Product and Service Solution (SPSS), software version 23 and the significance of the difference was determined using chi-square test. The difference between variables was

**Table 1 Characteristics and Nutritional status of the children from Jatinangor District**

	Stunted (n=14; 12.7%)	Normal (n=96;87.3%)	Total (n=110; 100%)
Age			
6 months	3	40	43 (39.1)
7 months	7	32	39 (35.5)
8 months	4	24	28 (25.4)
Sex			
Male	10	51	61 (55.5)
Female	4	45	49 (44.5)
Birth order			
1	3	38	41 (37.3)
2	7	39	46 (41.8)
3	3	14	17 (15.4)
≥ 4	1	5	6 (5.5)
Birth method			
Normal (pervaginam)	10	79	89 (80.9)
Sectio caesarea	3	16	19 (17.3)
Vakum/forceps	1	1	2 (1.8)
Birth weight			
< 2.5 kg	2	1	3 (2.7)
2.5 - 3.8 kg	11	85	96 (87.3)
> 3.8 kg	1	10	11 (10.0)
Birth gestational age			
37–42 weeks	14	90	104 (94.5)
>42 weeks	-	6	6 (5.5)
Mother's disease throughout pregnancy			
None	11	81	92 (83.6)
Hiperemesis gravidarum	1	7	8 (7.3)
Hypertension	2	4	6 (5.5)
Diabetes	-	-	-
Others	-	4	4 (3.6)
ANC			
Ever	14	95	109 (99.9)
Never	-	1	1 (0.9)
Birth attendance			
Paraji (traditional birth attendant)	-	-	-
Midwife	7	67	74 (67.3)
Medical doctor	2	4	6 (5.4)
Obstetrician	5	25	30 (27.3)
Child's basic immunization			
Complete (except measles)	14	88	102 (92.7)
Incomplete	-	8	8 (7.3)

**Table 2 Characteristics of The Parents (n=110) of The Children Recruited from Jatinangor District**

	Total N (%)
Father's occupation	
Unemployed	1 (0.9)
Laborer	30 (27.3)
Entrepreneur/merchant	38 (34.6)
Honorary teacher	4 (3.6)
Private employee	27 (24.5)
Civil workers/soldier/police/BUMN*/BUMD**	10 (9.1)
Mother's educational level	
Never goes to school	1 (0.9)
Elementary school	13 (11.8)
Junior high school	27 (24.6)
Senior high school	56 (50.9)
Diploma graduate	2 (1.8)
Bachelor graduate	8 (7.3)
Masters graduate	3 (2.7)
Mother's occupation	
Unemployed	77 (70)
Laborer	6 (5.5)
Entrepreneur/merchant	7 (6.4)
Honorary teacher	12 (10.9)
Private employee	4 (3.6)
Civil workers/soldier/police/BUMN*/BUMD**	4 (3.6)
Household income	
< district's minimum wage	70 (63.6)
≥ district's minimum wage	40 (36.4)

Note: \*BUMN: *Badan Usaha Milik Negara*, \*\*BUMD: *Badan Usaha Milik Daerah*

considered significant if the value of  $p < 0.05$ .

The ethical clearance has been obtained from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Padjadjaran (424/UN6.KEP/EC/2018). Data collection in Jatinangor Subdistrict has been also obtained by permission from Puskesmas Jatinangor and Sumedang District Health Office.

## Results

This study was succeeded in collecting 170 questionnaire data from mothers, however,

only 110 data were met the inclusion criteria. This 110 mothers had children who were categorized in normal and stunted as 87.3% and 12.7%, respectively (Table 1). Table 1 showed that most children in this study were in the age group of 6 months (39.1%) with boys (55.5%) was more prevalent than girls. The children were mostly the second child in their family (41.8%), and most of the mothers gave birth normally (80.9%) with a normal body weight between 2.5–3.8 kilogram (87.3%). When giving birth, most of the mothers were assisted by midwives (67.3%) with the majority of subjects giving birth at

**Table 3 Relation between Nutritional Status Based on Body Length Over Age and Breastfeeding among Children in Jatinangor District**

	Nutritional status based on body length/age		P-value
	Stunted n (%)	Normal n (%)	
Breastfeeding			
Exclusive	4 (8.0)	46 (92.0)	0.284
Non-exclusive	10 (16.7)	50 (83.3)	

a sufficient gestational age between 37–42 weeks (94.5%). Most of the mothers did not have any disease during pregnancy (83.6%) and antenatal care (ANC) were mostly done by midwives (69.1%). Almost all children had undergone basic immunization (92.7%), except for measles that will be given at the age of 9 months (Table 1).

Table 2 showed the characteristics of the parents of the children recruited. Father's job was mostly entrepreneur/merchant (34.6%), whereas most of the mothers did not work (70%) although they had middle education background (50.9%). More than half (63.6%) of the household had monthly household income below the district minimum wage.

The number of exclusive breastfeeding and non-exclusive breastfeeding among the children was presented and the nutritional status based on body length over age was compared, resulting in a non significant different between both groups ( $p=0.248$ )

## Discussion

Our study among children in Jatinangor, Bandung has shown that 12.7% were stunted. This number of stunting events is below 20%, therefore, according to WHO it is not described as a public health problem. The incidence of stunting in this study is also below the national stunting rate (37.2%) and the province of West Java (25.6%), however, this stunting among children requires further good management in nutrition plan and education.

Furthermore, there is no difference in the proportion of stunting events between children who get exclusive breastfeeding and non-exclusive breastfeeding. Study in Yogyakarta<sup>10</sup> has resulted otherwise, showing a significant relationship between exclusive breastfeeding and the incidence of stunting and children who did not get exclusive breastfeeding had 1.74

times higher chance to be stunting.<sup>10</sup> Similar result was obtained from a study in Surakarta in 2018 in children aged 24–59 months, showing a significant correlation between the incidence of stunting and non-exclusive breastfeeding and exclusive breastfeeding had a protective factor against stunting.<sup>11</sup> This difference might occur because the nutritional status of subjects aged 6–23 months and 24–59 months would be more influenced by complementary feeding given. The nutrition of children after the age of 6 months will be fulfilled by giving complementary food. When the complementary food is given, stunting can be prevented. In addition, the influence of factors such as the quality and quantity of breast milk may give different result in stunting.

In this study, stunting is more frequent in male. This result is supported by study in Malawi, showing that women has a higher average LAZ compared to men, therefore, boys are more likely to experience stunting.<sup>12</sup>

According to WHO stunting is caused by three factors, namely malnutrition, recurrent infections, and insufficient psychosocial stimulation. Stunting is also influenced by several factors that can increase the risk of stunting. These factors affect the growth of children from the womb until after birth.<sup>4</sup>

With the aim of fulfilling the nutritional needs of children for the first 6 months, WHO recommends exclusive breastfeeding which means breast milk is given for 6 months without other foods or drinks except for drugs and vitamins. When compared with the data on exclusive breastfeeding coverage in Sumedang District in 2016 (75.6%), exclusive breastfeeding in this study is still low.<sup>13</sup> Of the 14 stunting subjects in the study, 10 were included in the non-exclusive breastfeeding group. It can be concluded that 71.4% of stunting patients in this study were given non-exclusive breastfeeding breast milk. If



the stunting category is differentiated into stunted and severely stunted, more children with severely stunted nutritional status are given exclusive non-breastfeeding compared to exclusive breastfeeding.

Apart from being malnourished, stunting can also occur due to recurrent infections. Infection will affect nutritional status by reducing appetite, disturbing absorption of nutrients in the digestive tract, increasing catabolism, and diverting the use of nutrients to support the work of the immune system.<sup>1</sup> One factor that can increase the risk of infection is poor environmental sanitation. In addition to environmental sanitation, immunization is one of the factors associated with protection against several infectious diseases. In this study, basic immunization is carried out by most children (92.7%) in an effort to prevent infection.

The mother formal education and family's socioeconomic level are also an influential factors on child nutritional status and the risk of infection in children.<sup>14</sup> Those factors determine the ability of the family to provide nutritional needs and to maintain children's health. In this study more stunting sufferers came from families with monthly income below the district's minimum wage. This is in line with research in Ecuador<sup>15</sup> (2016) stating that the risk of stunting is decreased in families with high socioeconomic levels.

The risk of infection also increases when the mother gives birth by a traditional birth attendant (TBA), known as *Paraji* in Indonesia. There are no children in this study who used *Paraji* assistance for child birth, but delivered labors are assisted by midwives, general practitioners, or obstetrician. Even though good immunization and sanitation have been carried out to reduce the risk of infection, stunting still occur in this study giving a thought that the incidence of stunting in this study apt to be caused by malnutrition.

Apart from malnutrition and infection, stunting may be influenced by the condition of the baby at birth. Babies born at term and small compared to their age or referred to as small for gestational age is risk factor the number one for the incidence of stunting,<sup>16</sup> however, this fact is different from the results in our study, where most stunting sufferers born with a normal body weight and all have been born at normal gestational age.

In the prenatal period, genetic factors, health conditions and the adequacy of maternal nutrition determine the growth and development of the child they conceive.<sup>17</sup> This

is supported the fact that poor diet in pregnant women is associated with poor nutritional status in children, therefore, maternal health and nutrition need to be considered before, during and after pregnancy.<sup>18</sup> Presence of infections in the pregnant mother can also provide obstacles to the growth of children,<sup>19</sup> although in this study most mothers (83.6 %) did not state of the existence of illness during pregnancy.

Limitations in this study includes that the factors affecting the quality and quantity of breast milk given have not been explored. The relationship or opportunity between various factors that influenced stunting were not conducted, and a case-control study design may provide a better picture of causation compared to a cross-sectional study. However, data from this study can be used as baseline data for further research, specifically related to the intervention of stunting events in the work area of the Puskesmas Jatinangor.

As a conclusion, this study has shown that there is no difference in the proportion of stunting in children aged 6–9 months who are given exclusive breastfeeding or non-exclusive breastfeeding, but the number of stunting events is more common in non-exclusive breastfeeding groups.

Acknowledgement: This research was funded by the Universitas Padjadjaran Internal Grant

Conflict of Interest: the author states that there is no conflict of interest in this study.

## References

1. de Onis M, Branca F. Childhood stunting: a global perspective. *Matern Child Nutr.* 2016;12 Suppl 1:12–26.
2. UNICEF. Malnutrition - UNICEF DATA [Internet]. 2017[cited 2019 March 7] Available from: <https://data.unicef.org/topic/nutrition/malnutrition/>
3. Kementerian Kesehatan RI. Riset Kesehatan Dasar 2013. Jakarta: Kementerian Kesehatan Republik Indonesia; 2013.
4. Dewey KG, Begum K. Long-term consequences of stunting in early life. *Matern Child Nutr.* 2011;7 Suppl 3:5–18.
5. WHO. Global nutrition targets 2025: stunting policy brief. Geneva: Department of Nutrition for Health and Development WHO; 2014.
6. Prendergast AJ, Humphrey JH. The stunting syndrome in developing countries. *Paediatr Int Child Health.* 2014;34(4):250–65.
7. Cusick SE, Georgieff MK. The role of

- nutrition in brain development: the golden opportunity of the first 1000 days. *J Pediatr*. 2016;175:16–21.
8. WHO. Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals. Geneva: WHO Press; 2009.
  9. Kementerian Kesehatan Republik Indonesia. Situasi dan analisis ASI eksklusif. Jakarta: Kementerian Kesehatan Republik Indonesia; 2014.
  10. Hidayah F. ASI eksklusif sebagai faktor risiko kejadian stunting pada anak usia 6-24 bulan di kota Yogyakarta [Thesis]. Universitas Gadjah Mada; 2013.
  11. Lestari ED, Hasanah F, Nugroho NA. Correlation between non-exclusive breastfeeding and low birth weight to stunting in children. *Paediatr Indones*. 2018;58(3):123–7.
  12. Kuchenbecker J, Jordan I, Reinbott A, Herrmann J, Jeremias T, Kennedy G, et al. Exclusive breastfeeding and its effect on growth of Malawian infants: results from a cross-sectional study. *Pediatr Int Child Health*. 2015;35(1):14–23.
  13. Dinas Kesehatan Provinsi Jawa Barat. Profil kesehatan provinsi Jawa Barat. Bandung: Dinas Kesehatan Provinsi Jawa Barat; 2016.
  14. Rachmi CN, Agho KE, Li M, Baur LA. Stunting , underweight and overweight in children aged 2.0 – 4.9 years in Indonesia: prevalence trends and associated risk factors. *PLoS One*. 2016;11(5):e0154756.
  15. Roche ML, Gyorkos TW, Blouin B, Marquis GS, Sarsoza J, Kuhnlein H V. Infant and young child feeding practices and stunting in two highland provinces in Ecuador. *Matern Child Nutr*. 2017;13(2).
  16. Danaei G, Andrews KG, Sudfeld CR, Fink G, McCoy DC, Peet E, et al. Risk factors for childhood stunting in 137 developing countries: a comparative risk assessment analysis at global, regional, and country levels. *PLoS Med*. 2016;13(11):e1002164.
  17. Walker SP, Wachs TD, Grantham-mcgregor S, Black MM, Nelson CA, Huff SL, et al. Inequality in early childhood : risk and protective factors for early child development. *Lancet*. 2011;378:1325–38.
  18. Tessema M, Belachew T, Ersino G. Feeding patterns and stunting during early childhood in rural communities of Sidama, South Ethiopia. *Pan Afr Med J*. 2013;14:75.
  19. Martorell R, Zongrone A. Intergenerational influences on child growth and undernutrition. *Pediatr Perinat Epidemiol*. 2012;26 Suppl 1:302–14.